

AMENDMENTS TO THE CLAIMS

1-18. (Canceled)

19. (Currently Amended) A ~~computer-implemented~~ computing device comprising:

a processor; and

a compiler apparatus having instructions stored thereon for causing a computer to
~~translate for translating~~ a source program into a machine language program, said compiler
apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine
language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of
machine language instructions following an acquired directive,

wherein the optimization unit performs optimization by loop unrolling following a
directive when the directive acquisition unit acquires the directive on the optimization by loop
unrolling,

wherein the directive acquisition unit detects designation of the number of iterations of
specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object
of the designation detected by the directive acquisition unit based on the designated number of
iterations,

wherein the designation of the number of the iterations is the minimum number by which
the loop processing is iterated, and

wherein the optimization unit restrains generation of an escape code that is needed in the case of the number of the iterations being 0 when the minimum number is 1 or more.

20. (Currently Amended) A ~~computer-implemented~~ computing device comprising:

a processor; and

a compiler apparatus having instructions stored thereon for causing a computer to translate for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the optimization unit performs optimization by loop unrolling following a directive when the directive acquisition unit acquires the directive on the optimization by loop unrolling,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations is the minimum number by which the loop processing is iterated, and

wherein the optimization unit performs the optimization by loop unrolling when the minimum number is equivalent to or more than the number of development by the loop unrolling.

21. (Currently Amended) ~~A computer-implemented~~ computing device comprising:

a processor; and

~~a compiler apparatus having instructions stored thereon for causing a computer to translate~~ for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the optimization unit performs optimization by loop unrolling following a directive when the directive acquisition unit acquires the directive on the optimization by loop unrolling,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations guarantees that the loop

processing is iterated only an even number of times, and

wherein the optimization unit performs the optimization by loop unrolling assuming that the loop processing that is an object of designation detected by the directive acquisition unit is iterated only the even number of times.

22. (Currently Amended) A ~~computer-implemented~~ computing device comprising:

a processor; and

a compiler apparatus having instructions stored thereon for causing a computer to ~~translate~~for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the optimization unit performs optimization by loop unrolling following a directive when the directive acquisition unit acquires the directive on the optimization by loop unrolling,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations guarantees that the loop processing is iterated only an odd number of times, and

wherein the optimization unit performs the optimization by loop unrolling assuming that the loop processing that is an object of designation detected by the directive acquisition unit is iterated only the odd number of times.

23-29. (Canceled)

30. (Currently Amended) A computer-implemented computing device comprising:

a processor; and

a compiler apparatus having instructions stored thereon for causing a computer to translate for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following the acquired directive,

wherein the optimization unit performs optimization by allocating data in a memory region following a directive when the optimization unit acquires the directive on alignment of the array data to be allocated in a memory region,

wherein the directive acquisition unit acquires a directive for alignment of array data of a specific type together with a directive for translating the source program, and

wherein the optimization unit allocates all the array data of the specific type declared in the source program in the memory region so that its head address matches the alignment.

31. (Canceled)

32. (Currently Amended) ~~A computer-implemented~~ computing device comprising:
a processor; and

~~a compiler apparatus having instructions stored thereon for causing a computer to translate~~ for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following the acquired directive,

wherein the optimization unit performs optimization by allocating data in a memory region following a directive when the optimization unit acquires the directive on alignment of the array data to be allocated in a memory region, ~~and~~

wherein the directive acquisition unit detects a designation of alignment of data that a pointer variable of argument shown by the name of a specific variable indicates in the source program, and

wherein the optimization unit performs the optimization assuming that the data that is an object of designation detected by the directive acquisition unit is allocated in the memory region

by the designated alignment.

33. (Currently Amended) A ~~computer implemented~~ computing device comprising:

a processor; and

a compiler apparatus having instructions stored thereon for causing a computer to
~~translate~~ for translating a source program into a machine language program, said compiler
apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine
language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of
machine language instructions following the acquired directive,

wherein the optimization unit performs optimization by allocating data in a memory
region following a directive when the optimization unit acquires the directive on alignment of the
array data to be allocated in a memory region, ~~and~~

wherein the directive acquisition unit detects a designation of alignment of data that a
local pointer variable shown by the name of a specific variable indicates in the source program,
and

wherein the optimization unit performs the optimization assuming that the data that is an
object of designation detected by the directive acquisition unit is allocated in the memory region
by the designated alignment.

34-41. (Canceled)

42. (Currently Amended) The ~~compiler apparatus~~computing device according to claim 32,

wherein the optimization unit generates a pair instruction for transferring two or more kinds of data at the same time regarding a memory access instruction for accessing the data to be allocated in the memory region.

43. (Currently Amended) The ~~compiler apparatus~~computing device according to claim 33,

wherein the optimization unit generates a pair instruction for transferring two or more kinds of data at the same time regarding a memory access instruction for accessing the data to be allocated in the memory region.

44-47. (Canceled)

48. (Currently Amended) A ~~computer-implemented~~computing device comprising:
a processor; and
a compiler apparatus having instructions stored thereon for causing a computer to
~~translate~~for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations is the minimum number by which the loop processing is iterated, and

wherein the optimization unit restrains generation of an escape code that is needed in the case of the number of the iterations being 0 when the minimum number is 1 or more.

**49. (Currently Amended) A ~~computer implemented computing device comprising:~~
a processor; and**

a compiler apparatus having instructions stored thereon for causing a computer to translate for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the directive acquisition unit detects designation of the number of iterations of

specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations is the minimum number by which the loop processing is iterated, and

wherein the optimization unit performs the optimization by loop unrolling when the minimum number is equivalent to or more than the number of development by the loop unrolling.

50. (Currently Amended) A computer-implemented computing device comprising:

a processor; and

a compiler apparatus having instructions stored thereon for causing a computer to translate for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object

of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations guarantees that the loop processing is iterated only an even number of times, and

wherein the optimization unit performs the optimization by loop unrolling assuming that the loop processing that is an object of designation detected by the directive acquisition unit is iterated only the even number of times.

51. (Currently Amended) A computer-implemented computing device comprising:

a processor; and

a compiler apparatus having instructions stored thereon for causing a computer to translate for translating a source program into a machine language program, said compiler apparatus comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations guarantees that the loop processing is iterated only an odd number of times, and

wherein the optimization unit performs the optimization by loop unrolling assuming that the loop processing that is an object of designation detected by the directive acquisition unit is iterated only the odd number of times.

52-54. (Canceled)

55. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the optimization unit performs optimization by loop unrolling following a directive when the directive acquisition unit acquires the directive on the optimization by loop unrolling,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of

iterations,

wherein the designation of the number of the iterations is the minimum number by which the loop processing is iterated, and

wherein the optimization unit restrains generation of an escape code that is needed in the case of the number of the iterations being 0 when the minimum number is 1 or more.

56. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the optimization unit performs optimization by loop unrolling following a directive when the directive acquisition unit acquires the directive on the optimization by loop unrolling,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations is the minimum number by which

the loop processing is iterated, and

wherein the optimization unit performs the optimization by loop unrolling when the minimum number is equivalent to or more than the number of development by the loop unrolling.

57. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the optimization unit performs optimization by loop unrolling following a directive when the directive acquisition unit acquires the directive on the optimization by loop unrolling,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations guarantees that the loop processing is iterated only an even number of times, and

wherein the optimization unit performs the optimization by loop unrolling assuming that the loop processing that is an object of designation detected by the directive acquisition unit is iterated only the even number of times.

58. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the optimization unit performs optimization by loop unrolling following a directive when the directive acquisition unit acquires the directive on the optimization by loop unrolling,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations guarantees that the loop processing is iterated only an odd number of times, and

wherein the optimization unit performs the optimization by loop unrolling assuming that

the loop processing that is an object of designation detected by the directive acquisition unit is iterated only the odd number of times.

59. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following the acquired directive,

wherein the optimization unit performs optimization by allocating data in a memory region following a directive when the optimization unit acquires the directive on alignment of the array data to be allocated in a memory region,

wherein the directive acquisition unit acquires a directive for alignment of array data of a specific type together with a directive for translating the source program, and

wherein the optimization unit allocates all the array data of the specific type declared in the source program in the memory region so that its head address matches the alignment.

60. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine

language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following the acquired directive,

wherein the optimization unit performs optimization by allocating data in a memory region following a directive when the optimization unit acquires the directive on alignment of the array data to be allocated in a memory region,

wherein the directive acquisition unit detects a designation of alignment of data that a pointer variable of argument shown by the name of a specific variable indicates in the source program, and

wherein the optimization unit performs the optimization assuming that the data that is an object of designation detected by the directive acquisition unit is allocated in the memory region by the designated alignment.

61. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following the acquired directive,

wherein the optimization unit performs optimization by allocating data in a memory region following a directive when the optimization unit acquires the directive on alignment of the

array data to be allocated in a memory region,

wherein the directive acquisition unit detects a designation of alignment of data that a local pointer variable shown by the name of a specific variable indicates in the source program, and

wherein the optimization unit performs the optimization assuming that the data that is an object of designation detected by the directive acquisition unit is allocated in the memory region by the designated alignment.

62. (New) The computer-readable recording medium according to claim 60,

wherein the optimization unit generates a pair instruction for transferring two or more kinds of data at the same time regarding a memory access instruction for accessing the data to be allocated in the memory region.

63. (New) The computer-readable recording medium according to claim 61,

wherein the optimization unit generates a pair instruction for transferring two or more kinds of data at the same time regarding a memory access instruction for accessing the data to be allocated in the memory region.

64. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine

language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations is the minimum number by which the loop processing is iterated, and

wherein the optimization unit restrains generation of an escape code that is needed in the case of the number of the iterations being 0 when the minimum number is 1 or more.

65. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations is the minimum number by which the loop processing is iterated, and

wherein the optimization unit performs the optimization by loop unrolling when the minimum number is equivalent to or more than the number of development by the loop unrolling.

66. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations guarantees that the loop

processing is iterated only an even number of times, and

wherein the optimization unit performs the optimization by loop unrolling assuming that the loop processing that is an object of designation detected by the directive acquisition unit is iterated only the even number of times.

67. (New) A computer-readable recording medium having a compiler stored thereon for causing a computer to translate a source program into a machine language program, said compiler comprising:

a directive acquisition unit operable to acquire a directive for optimizing a machine language program to be generated; and

an optimization unit operable to perform optimization by generating a sequence of machine language instructions following an acquired directive,

wherein the directive acquisition unit detects designation of the number of iterations of specific loop processing in the source program,

wherein the optimization unit performs optimization of loop processing that is an object of the designation detected by the directive acquisition unit based on the designated number of iterations,

wherein the designation of the number of the iterations guarantees that the loop processing is iterated only an odd number of times, and

wherein the optimization unit performs the optimization by loop unrolling assuming that the loop processing that is an object of designation detected by the directive acquisition unit is iterated only the odd number of times.